

# New Entrants and the Role of Information Technology Case-Study: the Tele Flower Auction in the Netherlands

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## Abstract

*This article discusses the successful entrance of Tele Flower Auction (TFA) into the Dutch flower industry, enabled by Information Technology (IT). Indeed, the development and introduction of TFA is one of the initiatives in response to import restrictions by the traditional Dutch flower auctions. TFA is an electronic alternative that enables buyers to trade at a distance; this alternative is currently exploited by an import organization called East African Flowers (EAF). This article aims to provide a better understanding of the success of TFA. It provides a descriptive framework for analyzing the merits of electronic auctions. It uses that framework to evaluate the TFA case. The results of the analysis and the framework itself illustrate the various complex issues that arise in the design and implementation of electronic markets.*

## 1. Problem Specification

Since 1993 there has been an ongoing debate in the Dutch flower industry, about the increasing imports of foreign flower products at the Dutch flower auctions and about the use of new Information Technology (IT) in this industry. After a referendum in September 1994 the growers, who are the owners of the auctions, decided to ban foreign grower participation in the auctions during the summer. These efforts to reduce foreign access to the traditional Dutch auctions, led buyer organizations and foreign growers to announce the creation of competing auctions. Indeed, the development and introduction of Tele Flower Auction (TFA) is one of the initiatives in response to import restrictions by the traditional Dutch flower auctions. TFA is an electronic alternative that enables buyers to trade at a distance; this alternative is currently exploited by an import organization called East African Flowers (EAF).

This article aims

- to describe the entrance of TFA into the Netherlands;
- to give an overview of TFA and the role of IT in TFA;
- to explain through certain propositions a better understanding of the reasons for the success of new entrants and the role of IT.

This article further shows that IT enables new ways of competition and coordination, thus changing the ways in which individuals and organizations exchange goods and services. It also shows the globalization of the flower market, and the increasing cross-border competition.

The article is organized as follows. In section 2 the descriptive framework is presented. This framework will be used to describe the TFA case. In section 3 some characteristics of the Dutch flower industry are presented. The action of imposing import restrictions by Dutch growers and auctions is explained. In section 4 the concept and development of TFA, as a reaction to import restrictions, is described with the help of the framework of section 2. In section 5 the TFA case is analyzed, and propositions are developed. Conclusions are formulated in section 6.

## 2. Descriptive Framework

There are many theoretical and empirical studies of *auctions* [7,8,14,20,21], and *electronic markets* [1,5,6,11,13,17,18,19,23,24].

### Auctions

Milgrom [20] discusses the characteristics of auction theory. Hendricks and Porter [14] examines federal auctions for drainage leases and find that their data suggest that neighbor firms are better informed about the value of

a lease than non-neighbor firms, that neighbor firms coordinate their bidding decisions, and that both types of firms bid strategically in accordance with the Bayesian-Nash equilibrium. Cramton [7] described the full history of bidding dealing with the successful Nationwide Narrowband PCS Auction. Rothkopf and Harstad [21] critically analyzed the gaps between the existing theory and the reality of auctions. For theorists, Rothkopf and Harstad advise attention to the particulars of how auctions are modeled. They argue that modelling improvements will be of more direct value than use of equilibrium concepts more subtle than Nash's or new theorems that apply only to oversimplified models. Research presented in this article follows their advice.

### Electronic Markets

Research on the effects of IT on exchange organizations and processes is relatively new. Early research applied transaction costs and agency theory to predict shifts from hierarchies to market form of organizations [11,19]. The central argument of this line of research was that IT would improve communication, search, monitoring and information sorting capabilities, thereby reducing transaction costs and enabling purchasers to take advantage of production economies available in markets. A critical drawback inherent in this analysis was the definition and treatment of markets in abstract economic terms (i.e., markets coordinate economic activity through a price mechanism). In reality, different market structures exist, e.g. direct search, brokered, dealer and auction markets. Each of these structures organizes the trading process and related information processing activities in different ways. Thus the role and impact of IT can vary across types. The literature provides some examples. Konsynski et al. [17] provided a descriptive case study of an electronic market in used cars. Clemons and Weber [6] examined the effects of computerization on the London Stock Exchange. Clemons, Reddi, and Row [5] examined the impact of IT on the organization of production; they presented the 'Move to the Middle' hypothesis. Hess and Kemerer [13] tested the Electronic Market Hypothesis (EMH) against the empirical results of five case studies in the home mortgage market. Kambil and Van Heck [15] showed the role and impact of IT on the Dutch flower auction markets. Lee [18] examined two types of electronic markets: electronic brokerage, and electronic auction.

Due to the convergence of IT and telecommunication, and the proliferation and availability of bandwidth, the impact of electronic markets is expected to grow rapidly. Their effectiveness, however, is dependent on their design. Existing research in this new area provides exam-

ples of relevant issues supporting an effective design. What is lacking, however, is a systematic classification of various complex economic issues that arise when designing and implementing electronic markets.

Based on the analysis of these studies, we develop a framework to describe electronic auctions and apply this framework to formulate relevant propositions with regard to successes or failures of new entrants and the role of IT.

This descriptive framework consists of eight elements, which will be discussed next; see Figure 1.

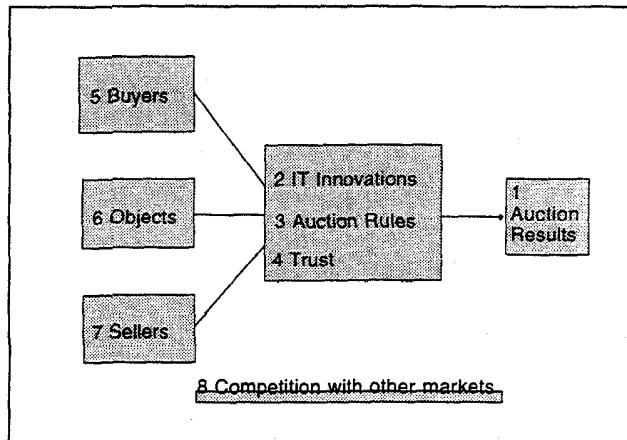


Figure 1. Descriptive Framework.

#### 1. Auction Results

Results or effects of the auction can be distinguished into results for (i) sellers, (ii) buyers, and (iii) intermediaries (auction house) [24]. Examples are prices of auctioned objects, transaction volumes, transaction speed, price volatility, and feasibility.

#### 2. IT Innovations

New IT innovations may be adopted and used by sellers and buyers, in different ways. We shall pay special interest to the way these innovations influence trust among sellers and buyers. We shall also study which (new) information can be stored, sent, and retrieved by IT.

#### 3. Auction Rules

Auction rules deal with statements of what can, should or must be done in certain auction circumstances. For example, specific auction rules may concern quality control. There are also auction rules concerning the role of the auctioneer.

#### 4. Trust

Trust deals with the belief, or willingness to believe, that one can rely on the goodness, strength, and ability of somebody (the seller or the buyer) or something (for example, IT innovations). Trust is the expectation that arises within a community of regular, honest, and cooperative behavior, based on commonly shared norms, on the part of other members of that community [10]. Fukuyama [10,p.27] argues that: 'people who do not trust one another will end up cooperating only under a system of formal rules and regulations, which have to be negotiated, agreed to, litigated, and enforced, sometimes by coercive means. This legal apparatus, serving as a substitute for trust, entails what economists call "transaction costs"'.

#### 5. Buyers

Buyers can be characterized by their decision-making behaviors (bidding strategies). In a Dutch flower auction there are many buyers bidding on each object; for example, in the TFA case there are 160 buyers.

#### 6. Objects

Auctioned objects deal with the characterization of the exchanged products in terms of product characteristics, quality, length of stems, number of units, and stems per unit.

#### 7. Sellers

Sellers can be characterized by their decision-making behaviors (selling strategies). In a Dutch flower auction each object is sold by a single seller; usually the seller is the producer of the object.

#### 8. Competition with other markets

The literature shows that most research on auctions has a single isolated auction point of view [21]. In Dutch flower auctions this viewpoint is too narrow. Dutch flower auctions are marketplaces in an international flower market. There are other market channels between sellers and buyers, such as the mediation offices. Therefore we introduce an extra element, namely competition with other markets (auctions, and market channels). We shall not primarily focus on this element, but shall consider it to be an important part of the environment.

In section 4 and 5 we shall study one practical case, namely the entrance of TFA into the Netherlands, to explore relevant propositions dealing with the success or failure of new entrants and the role of IT. The nature of this type of research is explorative. Such a case can be used for so-called analytical generalization, not statistical generalization [29]. We use the case study method, because it enables 'reality' to be captured in considerably

greater detail than other methods, and it also allows the analysis of a considerably greater number of variables. We held interviews, analyzed relevant reports, and obtained archival data.

### 3. The Dutch Flower Industry

#### 3.1. Industry Background

The Netherlands is the world's leading producer and distributor of cut flowers. The Dutch dominated the world export market for cut flowers in 1995 with a 59 per cent share. The world's two biggest flower auctions are in Aalsmeer (Flower Auction Aalsmeer) and Naaldwijk/Bleiswijk (Flower Auction Holland); every day on average 30 million flowers - originating not only from the Netherlands but also from countries such as Israel, Kenya and Zimbabwe - are traded in 100,000 transactions. There are seven Dutch flower auctions, namely in the villages of Aalsmeer, Naaldwijk/Bleiswijk, Rijnsburg, Grubbenvorst, Eelde, Bemmelen, and Vleuten. Their sales of cut flowers in 1995 were 1.6, 1.4, 0.6, 0.08, 0.05, 0.04, and 0.03 billion guilders respectively (Dfl 1.00 = US \$ 0.60). The Dutch flower auctions play a vital role in Holland's leadership of this industry, by providing efficient centers for price discovery and transactions of flowers between buyers and sellers. These auctions traditionally use the 'Dutch auction' as the mechanism for price discovery. They are established as cooperatives by the Dutch growers.

#### 3.2. Increasing Imports

Imports of cut flowers into the Netherlands are increasing; they rose by 78% between 1985 and 1990 [12]. The share of the European Community (EC) countries is growing. Spain, Kenya and Zimbabwe are becoming important suppliers, whereas Israel, Thailand, Colombia, and Ethiopia's supplies were declining over the period 1985-1990. In the period 1990-1993 the imports increased dramatically.

#### 3.3. Action: Import Reductions

Dutch growers felt that one of the main results of increasing imports was declining prices for all imported and Dutch products. For example, the Dutch producers of roses were furious about the decreasing prices caused by the increasing production capacities in Southern Europe and Africa. A survey in September 1994 showed that among 433 growers, 269 growers ranked foreign production as the most important threat, and 144 growers ranked auctioning imports as such [25]. Seventy-four

percent of the growers stated that imports had a negative effect on prices at Dutch auctions. Twelve percent of the growers claimed it had a positive effect. A reason for some growers to be positive, might be that they think that import products attract more buyers. Overall, the growers did not agree with the liberal import policy of Dutch auctions at that time. The board of directors of Flower Auction Aalsmeer and Flower Auction Holland intended to continue the liberal import policy. Their argument was that the Dutch flower auctions have to be the center of a global flower market, and not a market place for Dutch products only. In September 1994, both the growers of Flower Auction Aalsmeer and Flower Auction Holland decided to change the import policy and to impose very strict import reductions. They restricted the imports in the summer completely (between June 1, 1995 and September 15, 1995); they determined an upper bound of accepted imports during the rest of the year; and they proposed a very tight quality control system on imports.

The import reductions had three main effects (see also [22], and [28]):

1. The imports from Africa, Europe, and North-America decreased. Table 1 shows the amounts of imported flowers auctioned at Dutch auctions for the years 1993 - 1995. The imports via the seven Dutch auctions account for 60% of the total imports; the remaining 40% are imported directly by wholesalers/exporters and retailers. This table indicates that in 1994 the supply of imported flowers increased 17.2%. In 1995 it decreased 2.2% (total of 1.8 billion stems). In that year the imports from Israel increased 7.3%; the imports from Africa decreased 7.9%.
2. Prices in the season 1994/1995 decreased; the explanation is weather conditions and currency problems ('the strong guilder'). The impact of lower imports on the auction prices resulted in higher prices, as was expected by growers, but that impact is not clearly visible. Some growers and buyers had the impression flower prices were more volatile.
3. Importers had to find alternative marketing channels to sell their products. One of these importers, EAF, was very innovative, and introduced IT; namely a new electronic alternative called TFA.

### 3.4. Reaction: The Tele Flower Auction

An important effect of the import restrictions imposed by the Dutch flower auctions, was the creation of TFA by EAF [26]. EAF is one of the biggest importers of cut flowers; they specialize in supply from East Africa (Kenya, Tanzania, and Uganda). EAF was established in 1984; it is located in the Aalsmeer area. For EAF, the effect of the import restrictions was that 30% of their imports could no longer be traded via the Dutch auction clocks during the traditional import season; in the summer season 100% of their imports could not be traded at all. EAF announced the creation of TFA in December 1994. In January 1995 the system was tested. On March 24, 1995 TFA was launched with 70 buyers. In the beginning, TFA was restricted to 15 growers who were the main EAF suppliers. In March 1995 TFA and Flower Auction Aalsmeer agreed to use the same type of carts for transport, and they agreed that TFA could deliver its products to the buyers who had their facilities in the auction hall of Flower Auction Aalsmeer. After some months, EAF decided that growers from other countries (for example, Spain, Colombia, France, India, and Israel) were allowed to use TFA. After one year, approximately 150 buyers were connected to TFA. In October 1995, EAF decided that TFA would become a permanent electronic auction market. EAF expected a turnover of 100 million Dutch guilders for the growing season 1995/1996.

## 4. TFA Case Description

### 4.1. Introduction

TFA still uses the Dutch flower auction as the underlying price discovery concept. Surprisingly, the economics literature does not pay specific attention to the Dutch flower auction. Davis and Holt [8], among others, do mention the Dutch flower auction, but do not discuss it in great detail. Kambil and Van Heck [15], and Van Heck and Ribbers [24] describe the functioning of Dutch flower auctions in detail, but not from an economics perspective. In this section we shall describe the auction rules of the Dutch flower auction concept. We illustrate characteristics and results of the Dutch flower auction concept through empirical data of Flower Auction Aalsmeer.

Table 1: Number of Imported Flower Stems (in millions) at the Dutch Flower Auctions (Source: VBN, 1996).

Import Source	1993	1994	1995
Israel	621	656	703
Africa	598	693	638
Europe	256	398	397
North-America	48	49	33
South-America	22	19	23
Far-East	9	8	9

### *The Dutch Flower Auction Concept*

There are approximately 3500 varieties of cut flowers. These varieties are classified into 120 auction groups, according to the variety, size of the lot, and quality of the flowers. Dutch flower auctions use a clock for price discovery, as follows. The computerized auction clock in the room provides the buyers with information on producer, product, unit of currency, quality, and minimum purchase quantity. The flowers are transported through the auction room, and are shown to the buyers. The clock hand starts at a high price determined by the auctioneer, and drops until a buyer stops the clock by pushing a button. The auctioneer asks the buyer by intercom, how many units of the lot he or she will buy. The buyer provides the number of units. The clock is then reset, and the process begins for the left-over flowers, sometimes introducing a new minimum purchase quantity, until all units of the lot are sold. Table 2 illustrates the auction process by two examples with empirical auction data. The first rows deal with producer 1234 (column 2), who is responsible for transactions 408 to 420 (column 1). On January 4, 1996 this producer delivered roses (product group 52), or more specifically the brown rose 'Leonidas' (product number 10288). He delivered four lots of that type of rose (column 4). These lots had the same type of quality (A1), but were different in length (70, 60, 50, and 80 centimeters respectively) and in amounts of 9, 5, 3, and 12 units respectively. The first lot was auctioned, and buyer 3782 took 1 unit (out of 9) for a price of 93 cents per stem. The rest of the lot was auctioned again, and buyer 1854 bought 2 units for 95 cents. The remainder of the lot (6 units) was auctioned, and buyer 727 bought 3 units for 96 cents. Finally, the rest of the lot was bought by buyer 42 for 97 cents. The next lot of 5 units (roses with length 60 cm) was auctioned, and buyer 727 bought 4 units for 89 cents, buyer 1824 purchased the remaining unit for 91 cents. The next lot of 3 units (roses with

length 50) was auctioned, and buyer 3090 bought 1 unit for 67 cents, and buyer 2528 purchased the remaining 2 units for 68 cents. The last lot of 12 units (roses with length 80) was auctioned, and buyer 3282 bought 4 units for 109 cents, buyer 4157 bought 1 unit for 115 cents, buyer 134 bought 3 units for 115 cents, buyer 3462 bought 2 units for 116 cents, and buyer 3042 bought the remaining 2 units for 117 cents. The table shows that the price may increase during the auctioning of a lot (see, for example, transactions 408 through 411) or may decrease within a lot (see, for example, transactions 729 through 731). So the price is very volatile, considering different lots of the same producer or different lots of different producers.

Buyers must be physically present in the auction room. In practice, it turns out that the Dutch flower auction is an extremely efficient auction mechanism: it can handle a transaction every four seconds; for example, Flower Auction Aalsmeer handles via 13 clocks 30,000 transactions a day. It also reduces the amount of time that growers must spend on price discovery and bidding; hence they can focus on production. The auction provides a central location for the meeting of buyers, creating efficient quality control and logistics of product redistribution. This auction has "backtracking" possibilities: though the price movements are decreasing per sub-lot, the price can be multidirectional (up or down) within the whole lot. Buyers can withdraw their willingness to buy: they can indicate to the auctioneer fewer or more units than they originally intended to at the time they pushed the button. During the auctioning of the lot, buyers produce information on the value of the lot; this information is available to all buyers. Given these characteristics, we call the Dutch flower auction a *multi-unit, multiform price* Dutch auction.

Table 2: Auction Data Illustrating the Dutch Flower Auction Concept (Source: VBA, 1996).

Transaction Date and #	Producer	Product group	Product	Q	Length in cm	Total # of units	Stems per unit	Buyer	Number of units	Price in cents per stem
19960104										
408	1234	52	10288	A1	70	9	100	3782	1	93
409								1854	2	95
410								727	3	96
411								42	3	97
412	1234	52	10288	A1	60	5	100	727	4	89
413								1824	1	91
414	1234	52	10288	A1	50	3	100	3090	1	67
415								2528	2	68
416	1234	52	10288	A1	80	12	100	3282	4	109
417								4157	1	115
418								134	3	115
419								3462	2	116
420								3042	2	117
727	12	52	11087	A1	80	3	100	2893	2	91
728								752	1	87
729	12	52	11087	A1	70	6	100	727	1	79
730								1768	2	77
731								3004	3	77
732	12	52	11087	A1	60	8	100	3219	1	56
733								2669	3	56
734								727	4	54
735	12	52	11087	A1	50	3	100	727	3	46

### *The TFA Concept*

In the TFA, buyers can bid via their personal computer (PC) screens [2,9,26]. Each PC is connected to a fully computerized auction clock. Logistics and price discovery are uncoupled. Flowers are no longer visible for buyers, and buyers are no longer physical in an auction room. The PC provides the buyer with information on the next flower lots. On his PC the buyer can earmark interesting lots, so at the time those lots will be auctioned, the PC will warn the buyer. The PC provides information on the producer, product, unit of currency, quality, and minimum purchase quantity. The underlying auction concept remains the same: Dutch flower auction. On the PC screen the buyer sees the Dutch auction clock. The clock hand starts at a high price, and drops until a buyer stops the clock by pushing the space bar at the key board of the PC. The auctioneer asks the buyer, via an open telephone connection, how many flowers of the lot he or she will buy. The buyer provides the amount. The clock is then reset, and the process begins for the next units, until the remainder of the lot is sold.

Growers send the flowers to EAF, and EAF stores these flowers in Amstelveen. Logistics and price discovery are

uncoupled within the auction hall. The distribution of the flowers from the Amstelveen area to the buyer's address is done by transporters of EAF.

## **4.2. Description of the TFA Case**

### *1. Auction Results*

In June 1995, the Chief Executive Officer (CEO) of EAF/TFA, Mr. Simon van der Burg, stated that results of TFA were better than expected [22]. Buyers were enthusiastic about the quality and the delivery time of the auctioned products, and about the service level of TFA. The prices were on average not higher or lower than in the traditional Dutch flower auctions. Growers were also enthusiastic; EAF decided that growers not related to EAF could use TFA as their selling point. Every day an auction lasts for two hours. Every day, approximately 2 million stems are auctioned [9].

### *2. IT Innovations*

Compared with traditional auctions, buyers can trade at a distance. TFA provides better and more frequently updated supply information. The speed of the TFA system is amazing. Not only the auctioning process, but also the

after-sales process is very fast; sometimes within half a hour products are delivered at the buyer's address. The IT architecture includes S-1000 technology and ISDN connections.

### *3. Auction Rules*

TFA uses the same auction rules as in traditional Dutch flower auctions. The role of the auctioneer is the same. He identifies buyers, and determines the minimum amount of units. By setting this amount, the auctioneer can try to influence the price level.

### *4. Trust*

It soon became clear that one of the main propositions of TFA was that the quality of the flowers determines the buyers' trust in the TFA concept. TFA's motto is: 'Buyers have to trust the quality blindfold', because buyers cannot physically see the product anymore. Still, buyers who are nearby TFA, can inspect the imported flowers; 30% of the buyers do so regularly. Reliable product information and stable quality control are essential. Buyers also trust the IT innovations. One of the reasons seems to be that the Dutch auction clock is still the price discovery mechanism; buyers are used to that mechanism.

### *5. Buyers*

TFA started with 70 buyers. In March 1995 there were 125 buyers, mainly wholesalers/exporters, attached to TFA; in May 1995 there were 160 buyers (50% located in the Aalsmeer area, the other 50% distributed over the Netherlands). Some buyers say they miss the atmosphere of the traditional auction halls, where they could 'feel' the tension in the market. Other buyers prefer working behind the PC screen: they mentioned better concentration and a better overview of the market [2]. All buyers are very impressed by TFA's service, quality of products, and speed of delivery to their addresses. Buyers are very positive about the supply data presented by TFA. Buyers have a better overview of what is auctioned (compared with the traditional Dutch auctions), due to TFA's supply database.

### *6. Objects*

TFA auctions imported flowers. TFA has strict quality control norms, and provides the standard information on flowers; moreover, TFA also provides positive quality remarks.

### *7. Sellers*

TFA started with 15 African growers. After the decision to open TFA for others, the number of growers increased rapidly. Growers from Europe, Africa and Asia

use it as their marketing channel.

### *8. Competition with other markets*

The Dutch growers perceived TFA positively. In June 1995, 68 % of 378 Dutch growers who were interviewed, were in favor of the import restrictions; 55 % answered that TFA was the best alternative for imported flowers; 26% would like to re-install the liberal import policy [27]. Another interesting aspect is that 10% of the Dutch growers is thinking about choosing TFA as their marketing channel. In 1995 229 growers (in 1994: 269) ranked foreign production as the most important threat, and 92 (in 1994: 144) growers ranked auctioning imports as such [27]. Overall, Dutch growers still seem to believe that their position improved, although prices did not increase.

The development of TFA had an impact on other auctions. For example, the imports of Flower Auction Aalsmeer decreased with 23 %, whereas the average was 10% for all traditional Dutch auctions [3]. Other auctions can have an impact on TFA. For example, Flower Auction Holland decided to copy the TFA concept; they plan to introduce their own Tele Auction System in 1996. The auctions in Vleuten and Eelde also introduced the Tele Auction principle; approximately five wholesalers/retailers use these two systems.

## **5. TFA Case Analysis and Propositions**

What can we learn from this case study? We think that the TFA case tells the following important and interesting story.

### **5.1. New Entrants' Success**

The efforts to reduce foreign access to the traditional Dutch auctions, led buyer organizations and foreign growers to announce the creation of competing auctions. Indeed, EAF's development and introduction of TFA is one of the initiatives in response to these import restrictions by the traditional Dutch flower auctions. Surprisingly, from the beginning the CEO of EAF/TFA (Mr. Simon van der Burg) made clear that TFA was for EAF the second best solution. EAF preferred no import restrictions; EAF had to create a new market channel. Therefore, EAF moved forward into the flower chain. In the new situation, EAF imports flowers, and coordinates and organizes the price discovery process for imported flowers. It was the first time in Dutch history that an importer organization performs this function. Traditionally, the Dutch flower auctions are established as cooperatives by the Dutch growers. Another interesting point was the high speed of entrance. The import restrictions

were valid in October 1994; TFA started in March 1995. So EAF developed and implemented TFA in a few months.

The entrance of TFA was successful for all stakeholders. On average it resulted in the same prices as similar products made at the other Dutch flower auctions. Buyers are impressed by TFA's service, quality of products, and speed of delivery. One buyer stated that 'their logistical process is excellent; although we are very close to Flower Auction Aalsmeer, TFA delivers much faster than Flower Auction Aalsmeer' [3]. The reason is much simpler internal logistical streams, compared with the traditional Dutch auction. After some months TFA attracted more buyers and non-EFA sellers (from, for example, France and India). Some buyers missed the atmosphere of the auction rooms. Others liked the relaxed atmosphere, trading at a distance in their own offices. Some buyers liked the fact that they had a better overview and had to perform fewer administrative efforts. TFA expects a turnover of 100 million guilders for the growing season 1995/1996. Compared with the seven Dutch flower auctions, TFA ranks fourth.

The new entrants' success in general may be defined as the ability of the new entrants to build up significant sales volumes or turnovers, with fair prices for the traded products, in a short time frame. Usually, for the traditional competitors in the industry this will lead to lower sales volumes, turnovers, or price levels.

## 5.2. Quality of Information

Based on our analysis of the TFA case, we propose the following proposition.

*Proposition 1:* IT innovations lead to improved quality of information; improved quality of information leads to a more efficient market, and contribute to new entrants' success.

In the TFA case, the information on the screens, that represents the quality of the flowers, is reliable and precise. The IT innovation provides up-to-date supply information, which gives buyers a better overview. In the TFA case the supply information becomes more distributed among sellers and buyers, which will lead to more efficient markets (see [14]). Kleijnen [16] presents the many attributes or characteristics that determine the quality of information, such as timeliness, accuracy, aggregation, report mode, retention time, privacy and security, reliability and recovery.

## 5.3. Logistical Performance

We formulate the second proposition.

*Proposition 2:* IT innovations lead to the uncoupling of logistics from price discovery processes; this leads to better logistical performance, and contributes to new entrants' success.

TFA uncouples logistics and price discovery in the auction hall. Therefore, the internal logistics of the auction hall is much simpler, compared with the traditional auction system. This fact explains why TFA has a much better logistical performance and service level, in the opinion of the buyers. EAF paid much attention to the after-sales program (providing transport to the buyers).

## 5.4. Learning costs

We formulate the next proposition.

*Proposition 3:* Applying IT innovations to unchanged auction rules results in low learning costs, and contributes to new entrants' success.

One of the strengths of TFA is the use of the Dutch flower auction, as the underlying price discovery concept. The buyers are end-users of the system; they are used to work with this concept. They had to learn how to trade via the PC-screen, but these learning costs were relatively low. EAF paid much attention to the design of the user-interface of TFA.

## 5.5. Trust

We formulate the next proposition.

*Proposition 4:* Conformance of the actual and the perceived quality of the product, logistical performance, and IT performance result in high trust; high trust contributes to new entrants' success.

In general, sellers and buyers find that TFA keeps their promises concerning quality of products, delivery time of products, and reliability of IT performance. Buyers trust the TFA products. Usually, they get better products than expected from the data provided on the PC screen, due to a centralized quality control program. Buyers also trust TFA, because the underlying auction concept is the same: Dutch flower auction. Buyers trust the IT innovation: if a buyer is the first buyer to push the space bar at the key board of the PC, he or she is certain that the computer network transfers this signal fast and reliable, so he or she will be able to buy (part of or all of) the lot.



## 5.6. Competition with other markets

Besides the strengths of TFA, the weaknesses of the traditional Dutch auctions partly explain the success of TFA. The cooperative structure of the Dutch auctions (every single grower has one vote), the complexity of the after-sale logistics (due to the coupling of the logistics with the price discovery process), their inability to implement IT innovations quickly (for example, the failure in 1994 of Flower Auction Aalsmeer to implement the sample-based auction system) further decreased the market share of TFA's competitors. In the sample-based auction system the trustworthiness of the sample, as a representation of the lot, was questioned by the buyers. A detailed analysis of the sample-based auction failure is presented in [24].

The entrance of TFA into the Dutch floristry industry definitely had a profound impact on the competition in this industry. By opening TFA to non-EAF growers and buyers, TFA built critical mass in a short period. Imports of Flower Auction Aalsmeer decreased with 23 %, whereas the average was 10% for all traditional Dutch auctions [3]. Recently (May 1996), Flower Auction Aalsmeer decided to re-install the liberal import policy, and to implement an electronic clearinghouse for cut flowers and potted plants. The main reason is that they would like to remain the central market place for cut flowers and potted plants.

Other auctions can have an impact on TFA. For example, Flower Auction Holland decided to copy the TFA concept; recently (August 1996), they introduced their own Tele Auction System. The auctions in Vleuten and Eelde also introduced the Tele Auction principle.

It is difficult to predict the near future of TFA. Currently, TFA works on an innovative concept, presenting digitized images of flowers during the auction process. A complete uncoupling of logistics and price discovery, by sending data in stead of flowers to Amstelveen, might be possible in the near future.

## 6. Conclusions

The TFA case demonstrates the way a new entrant may use IT in an innovative way, in order to enter a market and compete with dominant players in that market. This case shows that new entrants can quickly build a competitive advantage. It illustrates the conclusion derived by Clemons, Croson, and Weber [4] concerning the strengths of new entrants in a competitive market.

We proposed a new descriptive framework that identifies relevant elements for describing electronic auctions. The framework turned out to be useful to describe the relevant elements of TFA. In the analysis of this case study, we identified constructs relevant to the success of the new entrant and the role of IT; these constructs are quality of information, logistical performance, learning costs, and trust. Previous work by Van Heck and Ribbers [24] has already identified important elements for the design of electronic markets, such as convergent motives of stakeholders, high trust, high entry barriers, and electronic market functionality and structure.

We suggest that the next step will be to refine these constructs and propositions into variables and hypotheses. With the help of multiple-case analysis, it will be possible to empirically test these hypotheses outside the flower industry. We think that in other industries IT also affects new entrants' success; for example, Clemons, Croson, and Weber [4] identify cases in the telephone and telecommunications industry, the retail banking industry, and the stock exchange markets. Testing in other industry settings will further generalize the results presented in this article.

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